

Naval Medical Center Portsmouth (NMCP) COVID-19 Literature Report

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Prepared By: Tracy C. Shields, MSIS, AHIP (Ms.; she/her) <tracy.c.shields2.civ@mail.mil>
Naval Medical Center Portsmouth; Library Services, Reference Medical Librarian

Purpose: These reports, published every other week on Fridays, are curated collections of current research, evidence reviews, special reports, grey literature, and news regarding the COVID-19 pandemic that may be of interest to medical providers, leadership, and decision makers. Please reach out with questions, suggestions for future topics, or any other feedback. If this report made a difference or impacted patient care, please let me know!

All reports are available online at <https://nmcp.libguides.com/covidreport>. Access is private; you will need to use the direct link or bookmark the URL.

Disclaimer: I am not a medical professional. This document is current as of the date noted above. While I make every effort to find and summarize available data, I cannot cover everything in the literature on COVID-19. Due to the rapid evolution of the literature, I will not update past reports when new information arises; for retracted papers specific to COVID-19, see the [list of retracted papers from Retraction Watch](#).

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The Big Picture

News in Brief

"New polls from the Kaiser Family Foundation ([KFF](#)) and the Annenberg Public Policy Center ([APPC](#)) show Americans are increasingly frustrated with the state of the pandemic and losing faith in authorities" ([CIDRAP](#)).

"Key senators propose an overhaul of how the U.S. prepares for pandemics" ([STAT](#)).

"The pandemic of unknowns — reaching a new normal in an age of uncertainty" ([Foreign Affairs](#)).

"As new COVID cases drop, can we be optimistic about the pandemic's end?" ([NPR](#)).

"We're thinking about endemicity all wrong — this one word has come to imply a single pandemic end point. Actually, we have no idea what happens next" ([Atlantic](#)).

"China's zero-COVID strategy: what happens next?" ([Nature](#))

Mortality

"The burden of 1 million excess deaths: 13.5 million years of life lost during the COVID pandemic" ([The Evidence Base](#)).

Podcast: "COVID death toll is likely millions more than official counts" ([Nature](#)).

Impact on Research

"Why Hong Kong may become a living laboratory in search for Covid-19 answers" ([STAT](#)).

"They built a smarter approach to Covid clinical trials. Now they want to do the same for other diseases" ([STAT](#)).

Long read: "The West already monopolized scientific publishing. Covid made it worse" ([Quartz](#)).

Webinars and Upcoming Events

WHAT: 2022 Preparedness Summit — Reimagining Preparedness in the Era of COVID-19

WHEN: 04-07 April 2022 in Atlanta, GA

"The COVID-19 pandemic has forced public health professionals across the globe to reevaluate what it means to be prepared for, respond to, recover from, and mitigate disaster response.

While facing the current global pandemic, health departments are planning for and responding to all hazard events including extreme weather events, emerging

outbreaks, and other 21st century threats to global health security. This response, like H1N1, Ebola, and Zika, has contributed to the growing body of knowledge around public health response and recovery. What we are learning from the COVID-19 response will help us to reimagine the disaster life cycle (preparedness, response, and recovery and mitigation) moving forward.

The theme of our next Preparedness Summit, Reimagining Preparedness in the Era of COVID-19, will provide an opportunity to reflect on lessons learned from current and previous responses, and highlight tools, resources, and learnings that we can apply into the future. By coming together as a community, we can assess where our preparedness and response efforts have fallen short, met the mark, or exceeded expectations, and explore opportunities to refocus, plan, and reimagine the future."

WEBSITE: <https://www.preparednesssummit.org/home>

WHAT: COVID Conversations — The Third Year of COVID: Is This the New Normal?

WHEN: Occurred 26 January 2022

"The 22nd COVID-19 Conversations webinar gave insight into what we have learned from the omicron variant, and how that knowledge, as well as an evolving understanding of vaccine efficacy, emerging therapeutics, and public health guidance can help us move toward the new normal."

[read the transcript \[pdf\]](#)

WEBSITE: <https://www.covid19conversations.org/Webinars/third-year>

Special Reports and Other Resources

GAO: [Significant Improvements Are Needed for Overseeing Relief Funds and Leading Responses to Public Health Emergencies](#) (27 January 2022)

"In our 9th comprehensive report on the COVID-19 pandemic, we provide updates on topics like pandemic emergency rental assistance and tax relief for businesses. We made 5 recommendations, including ways the Treasury Department can more quickly recover rental assistance overpayments.

We are also adding the Department of Health and Human Services' (HHS) leadership of public health emergencies to our High Risk List. For over a decade, we have found issues

with how HHS's leadership prepares for and responds to emergencies, including COVID-19, other infectious diseases, and extreme weather events, such as hurricanes....

In this report, GAO makes five new recommendations in the areas of emergency rental assistance, nutrition assistance, and tax relief for businesses. GAO is also designating the Department of Health and Human Services' (HHS) leadership and coordination of a range of public health emergencies as high risk. This designation is in keeping with long-standing efforts to identify federal programs needing transformation, and to help ensure sustained executive branch and congressional attention so the nation is prepared for future emergencies."

CSIS: [2022 Is the Year of Decision](#) (10 January 2022)

"The year 2022 is the year of decision. Confronted at the year's opening with the Omicron surge, we have no choice but to rethink U.S. approaches, at home and abroad, in both managing the ongoing pandemic and in creating better preparedness for the future. Although we have achieved significant progress with vaccines, boosters, and new therapeutics, we must come to terms with several hard realities, setbacks, and uncertainties. We must better unify and balance our domestic and international strategies, dissolving the tension between the two and making clear to Americans that each is essential to the truly global response necessary to resolve this crisis. We need to preserve and strengthen the fragile bipartisanship that has been and remains foundational to success in advancing America's health security."

Journal Articles

Lancet: [Pandemic preparedness and COVID-19: an exploratory analysis of infection and fatality rates, and contextual factors associated with preparedness in 177 countries, from Jan 1, 2020, to Sept 30, 2021](#) (01 February 2022)

"Background: National rates of COVID-19 infection and fatality have varied dramatically since the onset of the pandemic. Understanding the conditions associated with this cross-country variation is essential to guiding investment in more effective preparedness and response for future pandemics.

Methods: Daily SARS-CoV-2 infections and COVID-19 deaths for 177 countries and territories and 181 subnational locations were extracted from the Institute for Health Metrics and Evaluation's modelling database. Cumulative infection rate and infection-fatality ratio (IFR) were estimated and standardised for environmental, demographic, biological, and economic factors. For infections, we included factors associated with environmental seasonality (measured as the relative risk of pneumonia), population density, gross domestic product (GDP) per capita, proportion of the population living below

100 m, and a proxy for previous exposure to other betacoronaviruses. For IFR, factors were age distribution of the population, mean body-mass index (BMI), exposure to air pollution, smoking rates, the proxy for previous exposure to other betacoronaviruses, population density, age-standardised prevalence of chronic obstructive pulmonary disease and cancer, and GDP per capita. These were standardised using indirect age standardisation and multivariate linear models. Standardised national cumulative infection rates and IFRs were tested for associations with 12 pandemic preparedness indices, seven health-care capacity indicators, and ten other demographic, social, and political conditions using linear regression. To investigate pathways by which important factors might affect infections with SARS-CoV-2, we also assessed the relationship between interpersonal and governmental trust and corruption and changes in mobility patterns and COVID-19 vaccination rates.

Findings: The factors that explained the most variation in cumulative rates of SARS-CoV-2 infection between Jan 1, 2020, and Sept 30, 2021, included the proportion of the population living below 100 m (5.4% [4.0–7.9] of variation), GDP per capita (4.2% [1.8–6.6] of variation), and the proportion of infections attributable to seasonality (2.1% [95% uncertainty interval 1.7–2.7] of variation). Most cross-country variation in cumulative infection rates could not be explained. The factors that explained the most variation in COVID-19 IFR over the same period were the age profile of the country (46.7% [18.4–67.6] of variation), GDP per capita (3.1% [0.3–8.6] of variation), and national mean BMI (1.1% [0.2–2.6] of variation). 44.4% (29.2–61.7) of cross-national variation in IFR could not be explained. Pandemic-preparedness indices, which aim to measure health security capacity, were not meaningfully associated with standardised infection rates or IFRs. Measures of trust in the government and interpersonal trust, as well as less government corruption, had larger, statistically significant associations with lower standardised infection rates. High levels of government and interpersonal trust, as well as less government corruption, were also associated with higher COVID-19 vaccine coverage among middle-income and high-income countries where vaccine availability was more widespread, and lower corruption was associated with greater reductions in mobility. If these modelled associations were to be causal, an increase in trust of governments such that all countries had societies that attained at least the amount of trust in government or interpersonal trust measured in Denmark, which is in the 75th percentile across these spectrums, might have reduced global infections by 12.9% (5.7–17.8) for government trust and 40.3% (24.3–51.4) for interpersonal trust. Similarly, if all countries had a national BMI equal to or less than that of the 25th percentile, our analysis suggests global standardised IFR would be reduced by 11.1%.

Interpretation: Efforts to improve pandemic preparedness and response for the next pandemic might benefit from greater investment in risk communication and community engagement strategies to boost the confidence that individuals have in public health guidance. Our results suggest that increasing health promotion for key modifiable risks is associated with a reduction of fatalities in such a scenario."

PLoS Med: [Overall and cause-specific hospitalisation and death after COVID-19 hospitalisation in England: A cohort study using linked primary care, secondary care, and death registration data in the OpenSAFELY platform](#) (25 January 2022)

"Background: There is concern about medium to long-term adverse outcomes following acute Coronavirus Disease 2019 (COVID-19), but little relevant evidence exists. We aimed to investigate whether risks of hospital admission and death, overall and by specific cause, are raised following discharge from a COVID-19 hospitalisation.

Methods and findings: With the approval of NHS-England, we conducted a cohort study, using linked primary care and hospital data in OpenSAFELY to compare risks of hospital admission and death, overall and by specific cause, between people discharged from COVID-19 hospitalisation (February to December 2020) and surviving at least 1 week, and (i) demographically matched controls from the 2019 general population; and (ii) people discharged from influenza hospitalisation in 2017 to 2019. We used Cox regression adjusted for age, sex, ethnicity, obesity, smoking status, deprivation, and comorbidities considered potential risk factors for severe COVID-19 outcomes. We included 24,673 postdischarge COVID-19 patients, 123,362 general population controls, and 16,058 influenza controls, followed for ≤ 315 days. COVID-19 patients had median age of 66 years, 13,733 (56%) were male, and 19,061 (77%) were of white ethnicity. Overall risk of hospitalisation or death (30,968 events) was higher in the COVID-19 group than general population controls (fully adjusted hazard ratio [aHR] 2.22, 2.14 to 2.30, $p < 0.001$) but slightly lower than the influenza group (aHR 0.95, 0.91 to 0.98, $p = 0.004$). All-cause mortality (7,439 events) was highest in the COVID-19 group (aHR 4.82, 4.48 to 5.19 versus general population controls [$p < 0.001$] and 1.74, 1.61 to 1.88 versus influenza controls [$p < 0.001$]). Risks for cause-specific outcomes were higher in COVID-19 survivors than in general population controls and largely similar or lower in COVID-19 compared with influenza patients. However, COVID-19 patients were more likely than influenza patients to be readmitted or die due to their initial infection or other lower respiratory tract infection (aHR 1.37, 1.22 to 1.54, $p < 0.001$) and to experience mental health or cognitive-related admission or death (aHR 1.37, 1.02 to 1.84, $p = 0.039$); in particular, COVID-19 survivors with preexisting dementia had higher risk of dementia hospitalisation or death (age- and sex-adjusted HR 2.47, 1.37 to 4.44, $p = 0.002$). Limitations of our study were that reasons for hospitalisation or death may have been misclassified in some cases due to inconsistent use of codes, and we did not have data to distinguish COVID-19 variants.

Conclusions: In this study, we observed that people discharged from a COVID-19 hospital admission had markedly higher risks for rehospitalisation and death than the general population, suggesting a substantial extra burden on healthcare. Most risks were similar to those observed after influenza hospitalisations, but COVID-19 patients had higher risks of

all-cause mortality, readmission or death due to the initial infection, and dementia death, highlighting the importance of postdischarge monitoring."

Acad Emerg Med: [Prediction Models for Severe Manifestations and Mortality due to COVID-19: A Systematic Review](#) (22 January 2022)

"Background: Throughout 2020, the coronavirus disease 2019 (COVID-19) has become a threat to public health on national and global level. There has been an immediate need for research to understand the clinical signs and symptoms of COVID-19 that can help predict deterioration including mechanical ventilation, organ support, and death. Studies thus far have addressed the epidemiology of the disease, common presentations, and susceptibility to acquisition and transmission of the virus; however, an accurate prognostic model for severe manifestations of COVID-19 is still needed because of the limited healthcare resources available.

Objective: This systematic review aims to evaluate published reports of prediction models for severe illnesses caused COVID-19.

Methods: Searches were developed by the primary author and a medical librarian using an iterative process of gathering and evaluating terms. Comprehensive strategies, including both index and keyword methods, were devised for PubMed and EMBASE. The data of confirmed COVID-19 patients from randomized control studies, cohort studies, and case-control studies published between January 2020 and May 2021 were retrieved. Studies were independently assessed for risk of bias and applicability using the Prediction Model Risk Of Bias Assessment Tool (PROBAST). We collected study type, setting, sample size, type of validation, and outcome including intubation, ventilation, any other type of organ support, or death. The combination of the prediction model, scoring system, performance of predictive models, and geographic locations were summarized.

Results: A primary review found 445 articles relevant based on title and abstract. After further review, 366 were excluded based on the defined inclusion and exclusion criteria. Seventy-nine articles were included in the qualitative analysis. Inter observer agreement on inclusion 0.84 (95%CI 0.78 - 0.89). When the PROBAST tool was applied, 70 of the 79 articles were identified to have high or unclear risk of bias, or high or unclear concern for applicability. Nine studies reported prediction models that were rated as low risk of bias and low concerns for applicability.

Conclusion: Several prognostic models for COVID-19 were identified, with varying clinical score performance. Nine studies that had a low risk of bias and low concern for applicability, one from a general public population and hospital setting. The most promising and well-validated scores include Clift et al.¹⁵, and Knight et al.¹⁸, which seem to have accurate prediction models that clinicians can use in the public health and emergency department setting."

SARS-CoV-2 Virus and Variants

News in Brief

Image: "The Omicron Surge" ([Statista](#)) —>

"WHO chief warns conditions ripe for more COVID-19 variants" ([CIDRAP](#)).

"Why omicron is crushing hospitals — even though cases are often milder than delta" ([NPR](#)).

"Early data indicate vaccines still protect against Omicron's sister variant, BA.2" ([STAT](#)).

"The latest Covid variant is 1.5 times more contagious than omicron and already circulating in almost half of U.S. states" ([CNBC](#)).

"Omicron's sister variant spreads faster. So why did the one we call Omicron hit first?" ([STAT](#))

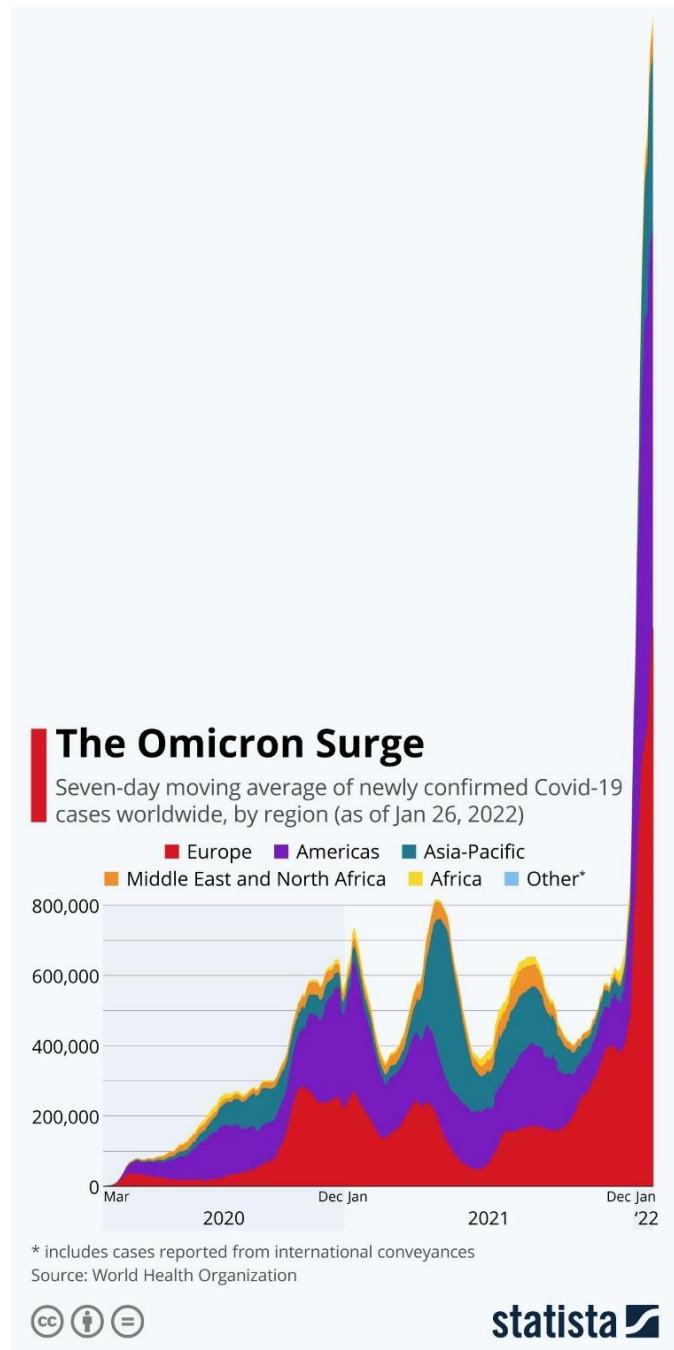
"The coronavirus will surprise us again — the variant after Omicron could look very different from any yet" ([Atlantic](#)).

Preprints and Early Results

"Scientists deliberately gave people COVID — here's what they learnt: Only half of participants who were exposed to the coronavirus developed infections, most with mild symptoms" ([Nature](#); see also: [Research Square preprint](#)).

"Two studies published in Eurosurveillance show the Omicron variant leads to fewer hospitalizations than the Delta variant, but an increased risk of infection in vaccinated and previously infected people" ([CIDRAP](#); see: [Eurosurveillance Netherlands study](#) and [Eurosurveillance Norway study](#)).

"Covid-infected HIV patient developed mutations, study shows" ([Bloomberg](#); see also: [SSRN preprint](#)).



Long Reads

"To learn how Covid affects the ear, scientists turn to cadavers. Can the novel coronavirus — and other viruses — directly infect the cells that enable hearing and balance?" ([Undark](#))

"What the Omicron wave is revealing about human immunity" ([Nature](#)).

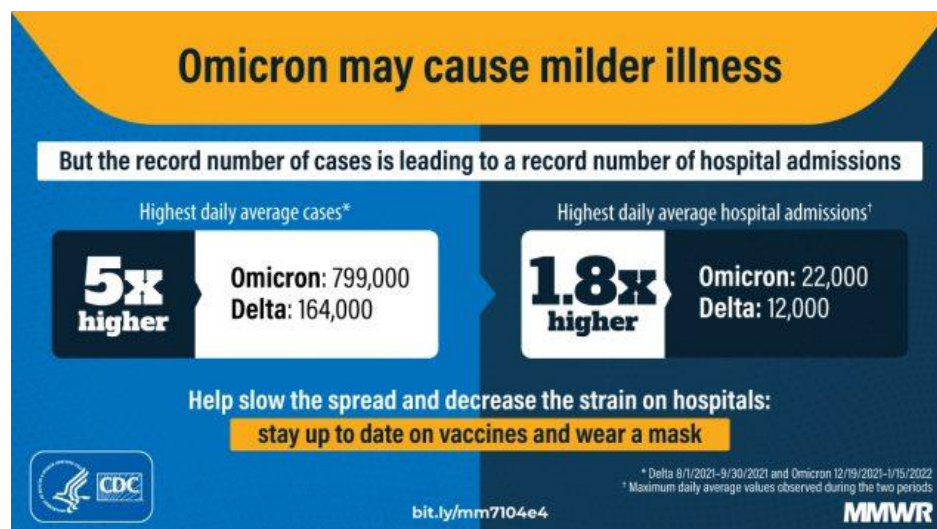
Journal Articles

MMWR: [Trends in Disease Severity and Health Care Utilization During the Early Omicron Variant Period Compared with Previous SARS-CoV-2 High Transmission Periods — United States, December 2020–January 2022](#) (28 January 2022)

"What is already known about this topic? The SARS-CoV-2 B.1.1.529 (Omicron) variant became predominant in the United States by late December 2021, leading to a surge in COVID-19 cases and associated ED visits and hospitalizations.

What is added by this report? Despite Omicron seeing the highest reported numbers of COVID-19 cases and hospitalizations during the pandemic, disease severity indicators, including length of stay, ICU admission, and death, were lower than during previous pandemic peaks.

What are the implications for public health practice? Although disease severity appears lower with the Omicron variant, the high volume of hospitalizations can strain local health care systems and the average daily number of deaths remains substantial. This underscores the importance of national emergency preparedness, specifically, hospital surge capacity and the ability to adequately staff local health care systems. In addition, being up to date on vaccinations and following other recommended prevention strategies are critical to preventing infections, severe illness, or death from COVID-19."



Transmission, Exposure, and Testing

News in Brief

"Free N95 masks are arriving at pharmacies and grocery stores. Here's how to get yours" ([NPR](#)).

"The physics of the N95 face mask" ([Wired](#)).

Journal Articles

Nat Commun: [Characterising within-hospital SARS-CoV-2 transmission events using epidemiological and viral genomic data across two pandemic waves](#) (03 February 2022)

"Hospital outbreaks of COVID19 result in considerable mortality and disruption to healthcare services and yet little is known about transmission within this setting. We characterise within hospital transmission by combining viral genomic and epidemiological data using Bayesian modelling amongst 2181 patients and healthcare workers from a large UK NHS Trust. Transmission events were compared between Wave 1 (1st March to 25th July 2020) and Wave 2 (30th November 2020 to 24th January 2021). We show that staff-to-staff transmissions reduced from 31.6% to 12.9% of all infections. Patient-to-patient transmissions increased from 27.1% to 52.1%. 40%-50% of hospital-onset patient cases resulted in onward transmission compared to 4% of community-acquired cases. Control measures introduced during the pandemic likely reduced transmissions between healthcare workers but were insufficient to prevent increasing numbers of patient-to-patient transmissions. As hospital-acquired cases drive most onward transmission, earlier identification of nosocomial cases will be required to break hospital transmission chains."

Nat Commun: [Tracking cryptic SARS-CoV-2 lineages detected in NYC wastewater](#) (03 February 2022)

"Tracking SARS-CoV-2 genetic diversity is strongly indicated because diversifying selection may lead to the emergence of novel variants resistant to naturally acquired or vaccine-induced immunity. To monitor New York City (NYC) for the presence of novel variants, we deep sequence most of the receptor binding domain coding sequence of the S protein of SARS-CoV-2 isolated from the New York City wastewater. Here we report detecting increasing frequencies of novel cryptic SARS-CoV-2 lineages not recognized in GISAID's EpiCoV database. These lineages contain mutations that had been rarely observed in clinical samples, including Q493K, Q498Y, E484A, and T572N and share many mutations with the Omicron variant of concern. Some of these mutations expand the tropism of SARS-CoV-2 pseudoviruses by allowing infection of cells expressing the human, mouse, or rat ACE2 receptor. Finally, pseudoviruses containing the spike amino acid sequence of these lineages were resistant to different classes of receptor binding domain neutralizing monoclonal

antibodies. We offer several hypotheses for the anomalous presence of these lineages, including the possibility that these lineages are derived from unsampled human COVID-19 infections or that they indicate the presence of a non-human animal reservoir."

JAMA Intern Med: [Assessing How Consumers Interpret and Act on Results From At-Home COVID-19 Self-test Kits: A Randomized Clinical Trial](#) (31 January 2022)

"Question: How do people interpret results of at-home COVID-19 self-test kits when they use instructions authorized by the US Food and Drug Administration or instructions developed with decision science principles, or no instructions, and do they choose to self-quarantine per federal recommendations or quarantine unnecessarily?

Findings: This randomized clinical trial of 360 adults in the US found that a substantial proportion misinterpreted the negative results of at-home self-tests by failing to consider the implications of a high pretest probability of infection and ignoring the federal self-quarantine recommendations. Decision science-based instructions may increase the contribution of at-home self-test kits to public health.

Meaning: The findings of this randomized clinical trial indicate that people who use at-home COVID-19 self-test kits may fail to self-quarantine or may quarantine unnecessarily because they misinterpret the implications of test results. Redesigned instructions may increase the benefits and reduce the harms from at-home self-test kits."

Am J Trop Med Hyg: [Asymmetric Relationship between Ambient Air Temperature and Incidence of COVID-19 in the Human Population](#) (28 January 2022)

"The complexity of transmission of COVID-19 in the human population cannot be overstated. Although major transmission routes of COVID-19 remain as human-to-human interactions, understanding the possible role of climatic and weather processes in accelerating such interactions is still a challenge. The majority of studies on the transmission of this disease have suggested a positive association between a decrease in ambient air temperature and an increase in human cases. Using data from 19 early epicenters, we show that the relationship between the incidence of COVID-19 and temperature is a complex function of prevailing climatic conditions influencing human behavior that govern virus transmission dynamics. We note that under a dry (low-moisture) environment, notably at dew point temperatures below 0°C, the incidence of the disease was highest. Prevalence of the virus in the human population, when ambient air temperatures were higher than 24°C or lower than 17°C, was hypothesized to be a function of the interaction between humans and the built or ambient environment. An ambient air temperature range of 17 to 24°C was identified, within which virus transmission appears to decrease, leading to a reduction in COVID-19 human cases."

Science: [Vaccination with BNT162b2 reduces transmission of SARS-CoV-2 to household contacts in Israel](#) (27 January 2022)

"The individual-level effectiveness of vaccines against COVID-19 is well established. However, few studies have examined vaccine effectiveness against transmission. We used a chain binomial model to estimate the effectiveness of vaccination with BNT162b2 (Pfizer-BioNTech mRNA-based vaccine) against household transmission of SARS-CoV-2 in Israel before and after the Delta variant emerged. Vaccination reduced susceptibility to infection by 89.4% [95% confidence interval (CI): 88.7%, 90.0%], whereas vaccine effectiveness against infectiousness given infection was 23.0% (95% CI: -11.3%, 46.7%) during days 10 to 90 after the second dose before June 1, 2021. Total vaccine effectiveness was 91.8% (95% CI: 88.1%, 94.3%). However, vaccine effectiveness is reduced over time as a result of the combined effect of waning of immunity and the emergence of the Delta variant."

Lancet Reg Health Am: [Cost-effective proactive testing strategies during COVID-19 mass vaccination: A modelling study](#) (15 January 2022)

"Background: As SARS-CoV-2 vaccines are administered worldwide, the COVID-19 pandemic continues to exact significant human and economic costs. Mass testing of unvaccinated individuals followed by isolation of positive cases can substantially mitigate risks and be tailored to local epidemiological conditions to ensure cost effectiveness.

Methods: Using a multi-scale model that incorporates population-level SARS-CoV-2 transmission and individual-level viral load kinetics, we identify the optimal frequency of proactive SARS-CoV-2 testing, depending on the local transmission rate and proportion immunized.

Findings: Assuming a willingness-to-pay of US\$100,000 per averted year of life lost (YLL) and a price of \$10 per test, the optimal strategy under a rapid transmission scenario ($Re \sim 2.5$) is daily testing until one third of the population is immunized and then weekly testing until half the population is immunized, combined with a 10-day isolation period of positive cases and their households. Under a low transmission scenario ($Re \sim 1.2$), the optimal sequence is weekly testing until the population reaches 10% partial immunity, followed by monthly testing until 20% partial immunity, and no testing thereafter.

Interpretation: Mass proactive testing and case isolation is a cost effective strategy for mitigating the COVID-19 pandemic in the initial stages of the global SARS-CoV-2 vaccination campaign and in response to resurgences of vaccine-evasive variants."

J Infect Dis: [COVID-19 Cluster Linked to Aerosol Transmission of SARS-CoV-2 via Floor Drains](#) (12 January 2022)

"Background: Recently, severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) transmission through exposure to aerosols has been suggested. Therefore, we investigated

the possibility of aerosol SARS-CoV-2 transmission within an apartment complex where residents reported testing positive for SARS-CoV-2 despite having no direct contact with other SARS-CoV-2-infected people.

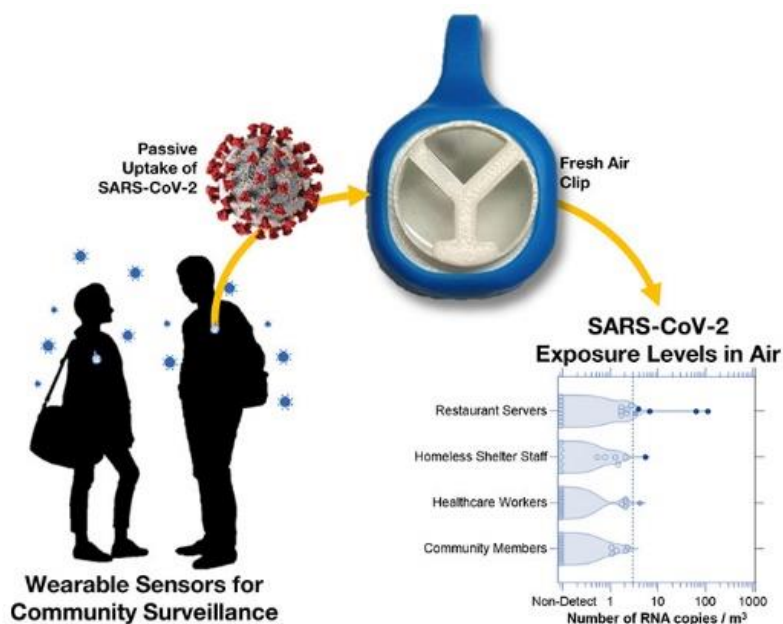
Methods: Information on symptom onset and exposure history of the patients was collected by global positioning system (GPS) tracking to investigate possible points of contact or spread. Samples collected from patients and from various areas of the complex were analyzed using RNA sequencing. Phylogenetic analysis was also performed.

Results: Of 19 people with confirmed SARS-CoV-2 infection, 5 reported no direct contact with other residents and were from apartments in the same vertical line. Eight environmental samples tested positive for the virus. Phylogenetic analyses revealed that 3 of the positive cases and 1 environmental sample belonged to the B.1.497 lineage. Additionally, 3 clinical specimens and 1 environmental sample from each floor of the complex had the same amino acid substitution in the ORF1ab region.

Conclusions: SARS-CoV-2 transmission possibly occurs between different floors of an apartment building through aerosol transmission via nonfunctioning drain traps."

Environ Sci Technol Lett: [Development and Application of a Polydimethylsiloxane-Based Passive Air Sampler to Assess Personal Exposure to SARS-CoV-2](#) (11 January 2022)

"Exhaled respiratory droplets and aerosols can carry infectious viruses and are an important mode of transmission for COVID-19. Recent studies have been successful in detecting airborne SARS-CoV-2 RNA in indoor settings using active sampling methods. The cost, size, and maintenance of these samplers, however, limit their long-term monitoring ability in high-risk transmission areas. As an alternative, passive samplers can be small, lightweight, and inexpensive and do not require electrical power or maintenance for continual operation. Integration of passive samplers into wearable designs can be used to better understand personal exposure to the respiratory virus. This study evaluated the use of a polydimethylsiloxane (PDMS)-based passive sampler to assess personal exposure to aerosol and droplet SARS-CoV-2. The rate



of uptake of virus-laden aerosol on PDMS was determined in lab-based rotating drum experiments to estimate time-weighted averaged airborne viral concentrations from passive sampler viral loading. The passive sampler was then embedded in a wearable clip design and distributed to community members across Connecticut to surveil personal SARS-CoV-2 exposure. The virus was detected on clips worn by five of the 62 participants (8%) with personal exposure ranging from 4 to 112 copies of SARS-CoV-2 RNA/m³, predominantly in indoor restaurant settings. Our findings demonstrate that PDMS-based passive samplers may serve as a useful exposure assessment tool for airborne viral exposure in real-world high-risk settings and provide avenues for early detection of potential cases and guidance on site-specific infection control protocols that preempt community transmission."

COVID-19 Vaccines

News in Brief

"Ten billion COVID vaccinations: world hits new milestone" ([Nature](#)).

As of 31 January 2022, the FDA has granted full approval to Moderna's COVID-19 vaccine for people 18 years and older; marketed under the name Spikevax, the vaccine is the second vaccine (following Pfizer's Comirnaty) approved for prevention of COVID-19 ([FDA](#)).

"Does the world need an Omicron vaccine? What researchers say" ([Nature](#)).

Early Results and Preprints

"Studies highlight benefits of COVID vaccine booster, longer dose spacing" ([CIDRAP](#); see: [first NEJM letter to the editor](#) and [second NEJM letter to the editor](#)).

"Lab study shows omicron-blocking antibodies persist four months after a Pfizer-BioNTech booster" ([WP](#); see also: [bioRxiv preprint](#)).

Vaccine Hesitancy and Misinformation

"Some Americans are hesitant about Covid vaccines. But they're all-in on unproven treatments" ([STAT](#)).

"A vaccine scientist's discredited claims have bolstered a movement of misinformation" ([WP](#)).

Journal Articles

MMWR: [SARS-CoV-2 Infection and Hospitalization Among Adults Aged ≥18 Years, by Vaccination Status, Before and During SARS-CoV-2 B.1.1.529 \(Omicron\) Variant Predominance — Los Angeles County, California, November 7, 2021–January 8, 2022](#) (04 February 2022)

"What is already known about this topic? COVID-19 vaccines are highly effective against severe SARS-CoV-2–associated outcomes, including those caused by the Delta variant.

What is added by this report? As of January 8, 2022, during Omicron predominance, COVID-19 incidence and hospitalization rates in Los Angeles County among unvaccinated persons were 3.6 and 23.0 times, respectively, those of fully vaccinated persons with a booster, and 2.0 and 5.3 times, respectively, those among fully vaccinated persons without a booster. During both Delta and Omicron predominance, incidence and hospitalization rates were highest among unvaccinated persons and lowest among vaccinated persons with a booster.

What are the implications for public health practice? Being up to date with COVID-19 vaccination is critical to protecting against SARS-CoV-2 infection and hospitalization."

MMWR: [COVID-19 Vaccination Coverage and Vaccine Confidence by Sexual Orientation and Gender Identity — United States, August 29–October 30, 2021](#) (04 February 2022)

"What is already known about this topic? Lesbian, gay, bisexual, and transgender (LGBT) persons are at increased risk for severe COVID-19 illness because of a higher prevalence of comorbidities.

What is added by this report? COVID-19 vaccination coverage and vaccine confidence were higher among gay or lesbian adults than among heterosexual adults and higher among gay men than gay or lesbian women. There were no significant differences in vaccination coverage among persons based on gender identity. Vaccination coverage was lowest among non-Hispanic Black LGBT persons across all categories of sexual orientation and gender identity.

What are the implications for public health practice? To prevent serious illness and death, all persons in the United States, including those in the LGBT community, should stay up to date with recommended COVID-19 vaccinations."

Nat Commun: [Self-reported COVID-19 vaccine hesitancy and uptake among participants from different racial and ethnic groups in the United States and United Kingdom](#) (02 February 2022)

"Worldwide, racial and ethnic minorities have been disproportionately impacted by COVID-19 with increased risk of infection, its related complications, and death. In the initial phase of population-based vaccination in the United States (U.S.) and United Kingdom (U.K.), vaccine hesitancy may result in differences in uptake. We performed a cohort study among U.S. and U.K. participants who volunteered to take part in the smartphone-based COVID

Symptom Study (March 2020-February 2021) and used logistic regression to estimate odds ratios of vaccine hesitancy and uptake. In the U.S. (n = 87,388), compared to white participants, vaccine hesitancy was greater for Black and Hispanic participants and those reporting more than one or other race. In the U.K. (n = 1,254,294), racial and ethnic minority participants showed similar levels of vaccine hesitancy to the U.S. However, associations between participant race and ethnicity and levels of vaccine uptake were observed to be different in the U.S. and the U.K. studies. Among U.S. participants, vaccine uptake was significantly lower among Black participants, which persisted among participants that self-reported being vaccine-willing. In contrast, statistically significant racial and ethnic disparities in vaccine uptake were not observed in the U.K sample. In this study of self-reported vaccine hesitancy and uptake, lower levels of vaccine uptake in Black participants in the U.S. during the initial vaccine rollout may be attributable to both hesitancy and disparities in access."

Clin Infect Dis: [Characteristics of Reported Deaths Among Fully Vaccinated Persons with COVID-19 —United States, January–April 2021](#) (29 January 2022)

"Background: COVID-19 vaccines are highly efficacious, but SARS-CoV-2 infections post-vaccination occur. We characterized COVID-19 cases among fully vaccinated persons with an outcome of death.

Methods: We analyzed COVID-19 cases voluntarily reported to CDC by US health departments during January 1, 2021-April 30, 2021. We included cases among U.S. residents with a positive SARS-CoV-2 test ≥ 14 days after completion of an authorized primary vaccine series and who had a known outcome (alive or death) as of May 31, 2021. When available, specimens were sequenced for viral lineage and death certificates were reviewed for cause(s) of death.

Results: Of 8,084 reported COVID-19 cases among fully vaccinated persons during the surveillance period, 245 (3.0%) died. Compared with patients who remained alive, those who died were older (median age 82 years vs. 57 years, $P < 0.01$), more likely to reside in a long-term care facility (51% vs. 18%, $P < 0.01$), and more likely to have at least one underlying health condition associated with risk for severe disease (64% vs. 24%, $P < 0.01$). Among 245 deaths, 191 (78%) were classified as COVID-19-related. Of 106 deaths with available death certificates, COVID-19 was listed on 81 (77%). There were no differences in the type of vaccine administered or the most common viral lineage (B.1.1.7).

Conclusions: COVID-19 deaths are rare in fully vaccinated persons, occurring most commonly in those with risk factors for severe disease, including older age and underlying health conditions. All eligible persons should be fully vaccinated against COVID-19 and follow other prevention measures to mitigate exposure risk."

MMWR: [Effectiveness of a Third Dose of Pfizer-BioNTech and Moderna Vaccines in Preventing COVID-19 Hospitalization Among Immunocompetent and Immunocompromised Adults — United States, August–December 2021](#) (28 January 2022)

"What is already known about this topic? For adults aged ≥ 18 years who received 2 doses of an mRNA COVID-19 vaccine, third doses are recommended. However, the associated benefits in preventing COVID-19 hospitalization are incompletely understood.

What is added by this report? In a study of hospitalized adults, compared with receipt of 2 mRNA COVID-19 vaccine doses, receipt of a third dose increased vaccine effectiveness against hospitalization among adults without and with immunocompromising conditions, from 82% to 97% and from 69% to 88%, respectively.

What are the implications for public health practice? Administration of a third COVID-19 mRNA vaccine dose as part of a primary series among immunocompromised adults, or as a booster dose among immunocompetent adults, provides improved protection against COVID-19–associated hospitalization."

NEJM: [Homologous and Heterologous Covid-19 Booster Vaccinations](#) (26 January 2022)

"Background: Although the three vaccines against coronavirus disease 2019 (Covid-19) that have received emergency use authorization in the United States are highly effective, breakthrough infections are occurring. Data are needed on the serial use of homologous boosters (same as the primary vaccine) and heterologous boosters (different from the primary vaccine) in fully vaccinated recipients.

Methods: In this phase 1-2, open-label clinical trial conducted at 10 sites in the United States, adults who had completed a Covid-19 vaccine regimen at least 12 weeks earlier and had no reported history of severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) infection received a booster injection with one of three vaccines: mRNA-1273 (Moderna) at a dose of 100 μ g, Ad26.COV2.S (Johnson & Johnson-Janssen) at a dose of 5×10^{10} virus particles, or BNT162b2 (Pfizer-BioNTech) at a dose of 30 μ g. The primary end points were safety, reactogenicity, and humoral immunogenicity on trial days 15 and 29.

Results: Of the 458 participants who were enrolled in the trial, 154 received mRNA-1273, 150 received Ad26.COV2.S, and 153 received BNT162b2 as booster vaccines; 1 participant did not receive the assigned vaccine. Reactogenicity was similar to that reported for the primary series. More than half the recipients reported having injection-site pain, malaise, headache, or myalgia. For all combinations, antibody neutralizing titers against a SARS-CoV-2 D614G pseudovirus increased by a factor of 4 to 73, and binding titers increased by a factor of 5 to 55. Homologous boosters increased neutralizing antibody titers by a factor of 4 to 20, whereas heterologous boosters increased titers by a factor of 6 to 73. Spike-specific T-cell responses increased in all but the homologous Ad26.COV2.S-boosted subgroup. CD8+

T-cell levels were more durable in the Ad26.COV2.S-primed recipients, and heterologous boosting with the Ad26.COV2.S vaccine substantially increased spike-specific CD8+ T cells in the mRNA vaccine recipients.

Conclusions: Homologous and heterologous booster vaccines had an acceptable safety profile and were immunogenic in adults who had completed a primary Covid-19 vaccine regimen at least 12 weeks earlier."

JAMA: [Myocarditis Cases Reported After mRNA-Based COVID-19 Vaccination in the US From December 2020 to August 2021](#) (25 January 2022)

"Question: What is the risk of myocarditis after mRNA-based COVID-19 vaccination in the US?

Findings: In this descriptive study of 1626 cases of myocarditis in a national passive reporting system, the crude reporting rates within 7 days after vaccination exceeded the expected rates across multiple age and sex strata. The rates of myocarditis cases were highest after the second vaccination dose in adolescent males aged 12 to 15 years (70.7 per million doses of the BNT162b2 vaccine), in adolescent males aged 16 to 17 years (105.9 per million doses of the BNT162b2 vaccine), and in young men aged 18 to 24 years (52.4 and 56.3 per million doses of the BNT162b2 vaccine and the mRNA-1273 vaccine, respectively).

Meaning: Based on passive surveillance reporting in the US, the risk of myocarditis after receiving mRNA-based COVID-19 vaccines was increased across multiple age and sex strata and was highest after the second vaccination dose in adolescent males and young men."

JAMA Netw Open: [Changes in COVID-19 Vaccine Hesitancy Among Black and White Individuals in the US](#) (21 January 2022)

"Question: How has COVID-19 vaccine hesitancy changed among Black and White individuals in the US since vaccines became publicly available?

Findings: This survey study of 1200 US adults found that COVID-19 vaccine hesitancy decreased more rapidly among Black individuals than among White individuals since December 2020. A key factor associated with this pattern seems to be the fact that Black individuals more rapidly came to believe that vaccines were necessary to protect themselves and their communities.

Meaning: This study suggests that ongoing efforts to increase vaccine uptake among Black individuals in the US should attend to a range of vaccination barriers beyond vaccine hesitancy."

Breakthrough Infections and Reinfections

Journal Articles

Clin Infect Dis: [Omicron outbreak at a private gathering in the Faroe Islands, infecting 21 of 33 triple-vaccinated healthcare workers](#) (03 February 2022)

"There are concerns that the SARS-CoV-2 Omicron variant evades immune responses due to unusually high numbers of mutations on the spike protein. Here we report a super-spreading event of Omicron infections amongst triple-vaccinated healthcare workers, infecting 21 of 33 attending a private gathering in the Faroe Islands."

Radiology: [Imaging and Clinical Features of COVID-19 Breakthrough Infections: A Multicenter Study](#) (01 February 2022)

"Summary: Vaccinated patients with COVID-19 breakthrough infections showed fewer chest CT findings of pneumonia compared to unvaccinated patients.

Background: Since vaccines against coronavirus disease 2019 (COVID-19) became available, rare breakthrough infections have been reported despite their high efficacies. Purpose To evaluate the clinical and imaging characteristics of COVID-19 breakthrough infections and compare them with those of unvaccinated COVID-19 patients.

Materials and Methods: In this retrospective multicenter cohort study, we analyzed data from three centers of patients (aged ≥ 18 years) registered in an open data repository for COVID-19 between June and August 2021. Hospitalized patients with baseline chest radiograph were divided into three groups according to their vaccination status. Differences between clinical and imaging features were analyzed using Pearson's chi-square test, Fisher's exact test, and analysis of variance (ANOVA). Univariable and multivariable logistic regression analyses were used to evaluate associations between clinical factors, including vaccination status, and clinical outcomes.

Results: Of the 761 hospitalized patients with COVID-19, the mean age was 47 years, 385 (51%) were women; Forty seven patients (6.2%) were fully vaccinated (breakthrough infection), 127 were partially vaccinated (17%), and 587 (77%) were unvaccinated. 412 (54%) of the patients underwent chest CT scans during hospitalization. Of patients with CT, the proportions of CT scans without pneumonia was 22% (71/326) of unvaccinated patients, 30% (19/64) of partially vaccinated patients, and 59% (13/22) of fully vaccinated patients ($P < .001$). Fully vaccinated status was associated with a lower risk of requiring supplemental oxygen than unvaccinated patients (odds ratio [OR], 95% confidence interval [CI]; 0.24, 0.09-0.64, $p = .005$) as well as lower risk of intensive care unit (ICU) admission (OR, 95% CI; 0.08, 0.09-0.78, $p = .02$.)

Conclusion: Patients with COVID-19 breakthrough infections had a significantly higher proportion of CT scans without pneumonia compared to unvaccinated patients. Vaccinated patients with breakthrough infections had lower likelihood of requiring supplemental oxygen or ICU admission."

See also: [editorial](#)

Am J Case Rep: [A 63-Year-Old Man with a Diagnosis of Re-Infection with SARS-CoV-2 Nine Weeks After an Initial Hospital Admission with COVID-19 Pneumonia](#) (24 January 2022)

"BACKGROUND: This report describes a 63-year-old Polish man presenting with COVID-19 (Coronavirus Disease 2019) pneumonia in early 2020, before vaccines to prevent severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) infection were available. Nine weeks following recovery from the initial infection, he tested positive again for SARS-CoV-2.

CASE REPORT: Man, age 63, was admitted to the Military Institute of Medicine on March 12, 2020, with body temperature 40°C, a cough, and breathlessness. On March 12, 2020, SARS-CoV-2 RNA was found in a nasopharynx smear. A chest X-ray (RTG) showed discrete areas of interstitial densities. On June 13, 2020, after 32 days of hospitalization and 2 negative real-time polymerase chain reaction (RT-PCR) test results, patient was released home in good general condition. On July 23, 2020 he reported to the emergency room with fever of 39°C and general weakness. A nasopharynx smear confirmed SARS-CoV-2 infection. On admission, the patient was in moderately good condition with auscultatory changes typical for pneumonia on both sides of the chest. On the seventh day of hospitalization, the patient was transported to the Intensive Care Unit (ICU) due to drastic deterioration in respiratory function. Respiratory support with non-invasive high-flow oxygen therapy (Opti-Flow) was used. On August 20, 2020, after negative RT-PCR test results, he was discharged in good general condition.

CONCLUSIONS: This case of COVID-19 pneumonia presented early in the COVID-19 pandemic of 2020, and the laboratory diagnosis of the initial and subsequent SARS-CoV-2 infection relied on the laboratory methods available at that time. However, several cases of repeat SARS-CoV-2 infection have been described before the development of vaccines in late 2020."

JAMA: [Association Between 3 Doses of mRNA COVID-19 Vaccine and Symptomatic Infection Caused by the SARS-CoV-2 Omicron and Delta Variants](#) (21 January 2022)

"Question: What is the association between 3 doses of mRNA COVID-19 vaccine and symptomatic SARS-CoV-2 infection with the Omicron and Delta variants?

Findings: In this test-negative case-control analysis that included 70 155 tests from symptomatic adults, the likelihood of vaccination with 3 mRNA vaccine doses (vs unvaccinated) was significantly lower among both Omicron (odds ratio, 0.33) and Delta

(odds ratio, 0.065) cases than SARS-CoV-2–negative controls; a similar pattern was observed with 3 vaccine doses vs 2 doses (Omicron odds ratio, 0.34; Delta odds ratio, 0.16).

Meaning: These findings suggest that vaccination with 3 doses of mRNA COVID-19 vaccine, compared with being unvaccinated and with receipt of 2 doses, was associated with protection against both the Omicron and Delta variants, although higher odds ratios for the association with Omicron infection suggest less protection for Omicron than for Delta."

Treatments and Management

News in Brief

NIH updated their COVID-19 treatment guidelines for use of the monoclonal antibody tixagevimab-cilgavimab (Evusheld) as pre-exposure prophylaxis in people >12 years that are moderately to severely immunocompromised and may have inadequate immune response to COVID-19 vaccination ([NIH](#)).

"Gilead COVID drug takes top spot for U.S. hospital spending - report" ([Reuters](#)).

"Why scientists are racing to develop more COVID antivirals" ([Nature](#)).

"Research collaboration launched to focus on repurposing existing anti-viral therapies to treat COVID-19" ([Oxford](#)).

"Florida appeals court says no 'legal right' to force use of ivermectin for COVID patient — the court said a family couldn't force Mayo Clinic Florida to administer the controversial treatment" ([Tampa Bay Times](#)).

Journal Articles

Lancet Diabet Endocrinol: [Sexual dimorphism in COVID-19: potential clinical and public health implications](#) (31 January 2022)

"Current evidence suggests that severity and mortality of COVID-19 is higher in men than in women, whereas women might be at increased risk of COVID-19 reinfection and development of long COVID. Differences between sexes have been observed in other infectious diseases and in the response to vaccines. Sex-specific expression patterns of proteins mediating virus binding and entry, and divergent reactions of the immune and endocrine system, in particular the hypothalamic–pituitary–adrenal axis, in response to acute stress might explain the higher severity of COVID-19 in men. In this Personal View, we discuss how sex hormones, comorbidities, and the sex chromosome complement influence

these mechanisms in the context of COVID-19. Due to its role in the severity and progression of SARS-CoV-2 infections, we argue that sexual dimorphism has potential implications for disease treatment, public health measures, and follow-up of patients predisposed to the development of long COVID. We suggest that sex differences could be considered in future pandemic surveillance and treatment of patients with COVID-19 to help to achieve better disease stratification and improved outcomes."

Clin Infect Dis: [Remdesivir plus dexamethasone versus dexamethasone alone for the treatment of COVID-19 patients requiring supplemental O2 therapy: a prospective controlled non-randomized study](#) (27 January 2022)

"Background: Remdesivir is an antiviral used to treat COVID-19 which improves some clinical outcomes. Dexamethasone has been shown to be effective in reducing mortality. It has been hypothesized that combination of these two drugs can improve mortality. We evaluated the effect of combination on mortality of COVID-19 patients requiring O2 therapy.

Methods: A prospective quasi-experimental study, including two independent, sequential controlled cohorts, one received remdesivir-dexamethasone and the other dexamethasone alone, was designed. All COVID-19 patients requiring supplemental O2 therapy were enrolled consecutively. The sample size to power mortality was a priori calculated. The primary endpoints were 30-day mortality and viral clearance differences. Secondary endpoints were differences in hospitalization times, improvement in respiratory failure (PO2/FiO2) and inflammatory indices (fibrinogen, CRP, neutrophil/lymphocyte ratio, D-Dimer). Kaplan-Meier curves and the log-rank test were used to evaluate significant differences in mortality between groups.

Results: 151 COVID-19 patients were enrolled (remdesivir/dexamethasone group, 76 and dexamethasone alone, 75). No differences in demographic, clinical and laboratory characteristics were observed between the two groups at baseline. Faster viral clearance occurred in the remdesivir/dexamethasone group compared to dexamethasone alone (median 6 vs 16 days; $p < 0.001$). 30-days mortality in the remdesivir/dexamethasone group was 1.3%, while in dexamethasone alone was 16% ($p < 0.005$). In the remdesivir/dexamethasone group compared to dexamethasone alone there was a reduction in hospitalization days ($p < 0.0001$) and a faster improvement in both respiratory function and inflammatory markers.

Conclusions: Remdesivir/dexamethasone treatment is associated with significant reduction in mortality, length of hospitalization, and faster SARS-CoV-2 clearance, compared to dexamethasone alone."

Eur Respir J: [Pulse oximeters' measurements vary across ethnic groups: An observational study in patients with Covid-19 infection](#) (27 January 2022)

"In an unselected cohort of patients admitted for Covid-19 infection, pulse oximetry measurement of oxygen saturation was consistently higher compared to arterial blood gas measurement in patients with a recorded Black, Asian or Mixed ethnicity compared to a White ethnicity reference group. These differences were particularly marked in the clinically important range of 85 to 89%, with mean values as measured by pulse oximeter being almost 5% higher than reality in individuals with a recorded Black, Asian or Mixed ethnicity. These observations extend previous concerns on this issue regarding those with Black ethnicity to those from a south-east Asian background, across a wide range of oxygen saturations."

JAMA Netw Open: [Association of Convalescent Plasma Treatment With Clinical Status in Patients Hospitalized With COVID-19: A Meta-analysis](#) (25 January 2022)

"Question: What is the pooled evidence from high-quality randomized clinical trials regarding the safety and potential benefit of convalescent plasma to treat hospitalized patients with COVID-19?

Findings: In this meta-analysis of 8 randomized clinical trials enrolling 2341 participants, individual patient data were monitored in real time and analyzed using a robust bayesian framework and advanced statistical modeling. No association of convalescent plasma with clinical outcomes was found.

Meaning: These findings suggest that real-time individual patient data pooling and meta-analysis during a pandemic are feasible, offering a model for future research and providing a rich data resource."

JAMA: [Effect of Noninvasive Respiratory Strategies on Intubation or Mortality Among Patients With Acute Hypoxemic Respiratory Failure and COVID-19: The RECOVERY-RS Randomized Clinical Trial](#) (24 January 2022)

"Question: What is the effect of initial noninvasive respiratory strategies using continuous positive airway pressure (CPAP) or high-flow nasal oxygen (HFNO), compared with an initial strategy of conventional oxygen therapy, on the risk of tracheal intubation or mortality among hospitalized adults with acute hypoxemic respiratory failure due to COVID-19?

Findings: In this randomized clinical trial of 1273 patients, the composite primary outcome of tracheal intubation or mortality within 30 days occurred in 36% of the patients in the CPAP group compared with 44% in the conventional oxygen therapy group, a difference that was statistically significant, and occurred in 44% in the HFNO group compared with 45% in the conventional oxygen therapy group, a difference that was not significantly different.

Meaning: Among patients with acute hypoxemic respiratory failure and COVID-19, an initial strategy of CPAP significantly reduced the risk of tracheal intubation or mortality compared with conventional oxygen therapy, but there was no significant difference between an initial strategy of HFNO compared with conventional oxygen therapy."

Pre-Existing Conditions, Comorbidities, and Complications

News in Brief

"There's one population that gets overlooked by an 'everyone will get COVID' mentality" ([NPR](#)).

"'I'm willing to die': NC man denied life-saving kidney transplant over vaccine requirement" ([WRAL](#)).

Journal Articles

Nat Commun: [A population-based cohort study of obesity, ethnicity and COVID-19 mortality in 12.6 million adults in England](#) (02 February 2022)

"Obesity and ethnicity are known risk factors for COVID-19 outcomes, but their combination has not been extensively examined. We investigate the association between body mass index (BMI) and COVID-19 mortality across different ethnic groups using linked national Census, electronic health records and mortality data for adults in England from the start of pandemic (January 2020) to December 2020. There were 30,067 (0.27%), 1,208 (0.29%), 1,831 (0.29%), 845 (0.18%) COVID-19 deaths in white, Black, South Asian and other ethnic minority groups, respectively. Here we show that BMI was more strongly associated with COVID-19 mortality in ethnic minority groups, resulting in an ethnic risk of COVID-19 mortality that was dependant on BMI. The estimated risk of COVID-19 mortality at a BMI of 40 kg/m² in white ethnicities was equivalent to the risk observed at a BMI of 30.1 kg/m², 27.0 kg/m², and 32.2 kg/m² in Black, South Asian and other ethnic minority groups, respectively."

CMAJ: [Outcomes in patients with and without disability admitted to hospital with COVID-19: a retrospective cohort study](#) (31 January 2022)

"Background: Disability-related considerations have largely been absent from the COVID-19 response, despite evidence that people with disabilities are at elevated risk for acquiring COVID-19. We evaluated clinical outcomes in patients who were admitted to hospital with COVID-19 with a disability compared with patients without a disability.

Methods: We conducted a retrospective cohort study that included adults with COVID-19 who were admitted to hospital and discharged between Jan. 1, 2020, and Nov. 30, 2020, at 7 hospitals in Ontario, Canada. We compared in-hospital death, admission to the intensive care unit (ICU), hospital length of stay and unplanned 30-day readmission among patients with and without a physical disability, hearing or vision impairment, traumatic brain injury, or intellectual or developmental disability, overall and stratified by age (≤ 64 and ≥ 65 yr) using multivariable regression, controlling for sex, residence in a long-term care facility and comorbidity.

Results: Among 1279 admissions to hospital for COVID-19, 22.3% had a disability. We found that patients with a disability were more likely to die than those without a disability (28.1% v. 17.6%), had longer hospital stays (median 13.9 v. 7.8 d) and more readmissions (17.6% v. 7.9%), but had lower ICU admission rates (22.5% v. 28.3%). After adjustment, there were no statistically significant differences between those with and without disabilities for in-hospital death or admission to ICU. After adjustment, patients with a disability had longer hospital stays (rate ratio 1.36, 95% confidence interval [CI] 1.19-1.56) and greater risk of readmission (relative risk 1.77, 95% CI 1.14-2.75). In age-stratified analyses, we observed longer hospital stays among patients with a disability than in those without, in both younger and older subgroups; readmission risk was driven by younger patients with a disability.

Interpretation: Patients with a disability who were admitted to hospital with COVID-19 had longer stays and elevated readmission risk than those without disabilities. Disability-related needs should be addressed to support these patients in hospital and after discharge."

QJM: [Short and long-term prognosis of glycemic control in COVID-19 patients with type 2 diabetes](#) (30 January 2022)

"Background and aim: To systematically evaluate the associations between glycemic control and short- to long-term outcomes in coronavirus disease 2019 (COVID-19) patients with type 2 diabetes (T2D).

Design and methods: A multi-center prospective cohort study including 574 COVID-19 patients with T2D were conducted in Wuhan, China. All patients were followed-up 1 year after hospital discharge using a uniformed questionnaire including self-reported symptoms, and the chronic obstructive pulmonary disease (COPD) assessment test (CAT) items.

Results: Of the 574 patients, 443 (77.2%) had well-controlled blood glucose. Glycemic control was significantly associated with decreased risk of death (OR: 0.24, 95% CI: 0.10-0.57), ICU admission (OR: 0.22, 95% CI: 0.10-0.49), invasive mechanical ventilation (OR: 0.25, 95% CI: 0.08-0.72), disease progression (OR: 0.25, 95% CI: 0.11-0.55), and composite outcome (OR: 0.26, 95% CI: 0.14-0.49). The top five long-term sequelae include fatigue (31.5%), sweating (21.2%), chest tightness (15.1%), anxiety (12.2%), myalgia (10.6%), and

short breath (6.4%). Glycemic control was associated with decreased risk of respiratory sequelae (OR: 0.42, 95% CI: 0.18-0.99, P = 0.048).

Conclusions: Glycemic control was significantly associated with short-term outcomes in COVID-19 patients with T2D, and showed a significant association with long-term respiratory sequelae. The management and control of blood glucose has a positive impact on prognosis of COVID-19."

JAMA Otolaryngol Head Neck Surg: [Sudden Sensorineural Hearing Loss During the COVID-19 Pandemic](#) (27 January 2022)

"This cohort study compares the incidence of sudden sensorineural hearing loss during the COVID-19 pandemic with that during 2018 and 2019 and assesses the association of lockdowns during the pandemic with sudden sensorineural hearing loss."

JAMA Neurol: [Immunogenicity and Safety of a Third SARS-CoV-2 Vaccine Dose in Patients With Multiple Sclerosis and Weak Immune Response After COVID-19 Vaccination](#) (24 January 2022)

"This cohort study investigates the immunogenicity and safety of a third SARS-CoV-2 vaccine dose in patients with multiple sclerosis who had a weak immune response to COVID-19 vaccination."

Crit Care Explor: [Serial Thromboelastography and the Development of Venous Thromboembolism in Critically Ill Patients With COVID-19](#) (18 January 2022)

"Objectives: To test the hypothesis that relatively lower clot strength on thromboelastography maximum amplitude (MA) is associated with development of venous thromboembolism (VTE) in critically ill patients with COVID-19.

Measurements and main results: Ninety-eight consecutive critically ill adults with laboratory-confirmed COVID-19 were enrolled. Thromboelastography parameters and conventional coagulation parameters were measured on days 0 (within 48 hr of ICU admission), 3, 5, and 7 after enrollment. The primary outcome was diagnosis of VTE with confirmed deep venous thrombosis and/or pulmonary embolism by clinical imaging or autopsy. Twenty-six patients developed a VTE. Multivariable regression controlling for antiplatelet exposure and anticoagulation dose with death as a competing risk found that lower MA was associated with increased risk of VTE. Each 1 mm increase in enrollment and peak MA was associated with an 8% and 14% decrease in the risk of VTE, respectively (enrollment MA: subdistribution hazard ratio [SHR], 0.92; 95% CI, 0.87-0.97; p = 0.003 and peak MA: SHR, 0.86; 95% CI, 0.81-0.91; p < 0.001). Lower enrollment platelet counts and fibrinogen levels were also associated with increased risk of VTE (p = 0.002 and p = 0.01, respectively). Platelet count and fibrinogen level were positively associated with MA (multivariable model: adjusted R² = 0.51; p < 0.001).

Conclusions: When controlling for the competing risk of death, lower enrollment and peak MA were associated with increased risk of VTE. Lower platelet counts and fibrinogen levels at enrollment were associated with increased risk of VTE. The association of diminished MA, platelet counts, and fibrinogen with VTE may suggest a relative consumptive coagulopathy in critically ill patients with COVID-19."

Long COVID / Post-COVID Syndrome

News in Brief

"Long-COVID symptoms less likely in vaccinated people, Israeli data say" ([Nature](#)).

"In 'chemo brain,' researchers see clues to unravel long Covid's brain fog" ([STAT](#)).

"CDC is asked to release race and gender data on long covid" ([WP](#)).

Journal Articles

Clin Infect Dis: [Symptoms compatible with long-COVID in healthcare workers with and without SARS-CoV-2 infection – results of a prospective multicenter cohort](#) (28 January 2022)

"Background: The burden of long-term symptoms (i.e. long-COVID) in patients after mild COVID-19 is debated. Within a cohort of healthcare workers (HCW), frequency and risk factors for symptoms compatible with long-COVID are assessed.

Methods: Participants answered baseline (August/September 2020) and weekly questionnaires on SARS-CoV-2 nasopharyngeal swab (NPS) results and acute disease symptoms. In January 2021, SARS-CoV-2 serology was performed; in March, symptoms compatible with long-COVID (including psychometric scores) were asked and compared between HCW with positive NPS, seropositive HCW without positive NPS (presumable a-/pauci-symptomatic infections), and negative controls. Also, the effect of time since diagnosis and quantitative anti-S was evaluated. Poisson regression was used to identify risk factors for symptom occurrence.

Results: Of 3'334 HCW (median 41 years; 80% female), 556 (17%) had a positive NPS and 228 (7%) were only seropositive. HCW with positive NPS more frequently reported ≥ 1 symptom compared to controls (73%vs.52%, $p<0.001$); seropositive HCW without positive NPS did not score higher than controls (58%vs.52%, $p=0.13$), although impaired taste/olfaction (16%vs.6%, $p<0.001$) and hair loss (17%vs.10%, $p=0.004$) were more common. Exhaustion/burnout was reported by 24% of negative controls. Many symptoms

remained elevated in those diagnosed >6 months ago; anti-S titers correlated with high symptom scores. Acute viral symptoms in weekly questionnaires best predicted long-COVID symptoms. Physical activity at baseline was negatively associated with neurocognitive impairment and fatigue scores.

Conclusions: Seropositive HCW without positive NPS are only mildly affected by long-COVID. Exhaustion/burnout is common, even in non-infected HCW. Physical activity might be protective against neurocognitive impairment/fatigue symptoms after COVID-19."

J Infect Dis: [Persistent Autoimmune Activation and Proinflammatory State in Post-COVID Syndrome](#) (25 January 2022)

"Background: The immunopathological pathways enabling post-COVID syndrome (PCS) development are not entirely known. We underwent a longitudinal analysis of patients with COVID-19 who developed PCS aiming to evaluate the autoimmune and immunological status associated with this condition.

Methods: Thirty-three patients were included for longitudinal clinical and autoantibody analyses of whom 12 patients were assessed for cytokines and lymphocyte populations. Patients were followed during 7-11 months after acute COVID-19. Autoimmune profile and immunological status were evaluated mainly by enzyme-linked-immunosorbent assays and flow cytometry.

Results: Latent autoimmunity and overt autoimmunity persisted over time. A proinflammatory state was observed in patients with PCS characterized by upregulated IFN- α , TNF- α , G-CSF, IL-17A, IL-6, IL-1 β , and IL-13, whereas IP-10 was decreased. In addition, PCS was characterized by increased levels of Th9, CD8+ effector T cells, naive B cells, and CD4+ effector memory T cells. Total levels of IgG S1-SARS-CoV-2 antibodies remained elevated over time.

Discussion: The clinical manifestations of PCS are associated with the persistence of a proinflammatory, and effector phenotype induced by SARS-CoV-2 infection. This long-term persistent immune activation may contribute to the development of latent and overt autoimmunity. Results suggest the need to evaluate the role of immunomodulation in the treatment of PCS."

Cell: [Multiple Early Factors Anticipate Post-Acute COVID-19 Sequelae](#) (24 January 2022)

"Post-acute sequelae of COVID-19 (PASC) represent an emerging global crisis. However, quantifiable risk-factors for PASC and their biological associations are poorly resolved. We executed a deep multi-omic, longitudinal investigation of 309 COVID-19 patients from initial diagnosis to convalescence (2-3 months later), integrated with clinical data, and patient-reported symptoms. We resolved four PASC-anticipating risk factors at the time of initial COVID-19 diagnosis: type 2 diabetes, SARS-CoV-2 RNAemia, Epstein-Barr virus viremia, and

specific autoantibodies. In patients with gastrointestinal PASC, SARS-CoV-2-specific and CMV-specific CD8+ T cells exhibited unique dynamics during recovery from COVID-19. Analysis of symptom-associated immunological signatures revealed coordinated immunity polarization into four endotypes exhibiting divergent acute severity and PASC. We find that immunological associations between PASC factors diminish over time leading to distinct convalescent immune states. Detectability of most PASC factors at COVID-19 diagnosis emphasizes the importance of early disease measurements for understanding emergent chronic conditions and suggests PASC treatment strategies."

JAMA: [Clinical Outcomes Among Patients With 1-Year Survival Following Intensive Care Unit Treatment for COVID-19](#) (24 January 2022)

"Question: What are the 1-year outcomes among patients who survive intensive care unit (ICU) treatment for COVID-19?

Findings: In this exploratory multicenter prospective cohort study that included 246 patients who were alive 1 year following ICU treatment for COVID-19, 74.3% reported physical symptoms, 26.2% reported mental symptoms, and 16.2% reported cognitive symptoms.

Meaning: Physical, mental, and cognitive symptoms were frequent 1 year after ICU treatment for COVID-19."

Pediatric Population

News in Brief

At the request of the FDA, Pfizer/BioNTech submitted a request for EUA of its COVID-19 vaccine for use in children 6 months to 4 years old ([Pfizer](#)).

The FDA's Vaccines and Related Biological Products Advisory Committee will meet on 15 February to evaluate the EUA in that age group ([FDA](#)).

Journal Articles

JAMA Netw Open: [Comparison of Use of the Massachusetts Child Psychiatry Access Program and Patient Characteristics Before vs During the COVID-19 Pandemic](#) (02 February 2022)

"This cross-sectional study compares the number of encounters at the Massachusetts Child Psychiatry Access Program, patient characteristics, and mental health diagnoses before vs during the COVID-19 pandemic."

Science: [Indirect protection of children from SARS-CoV-2 infection through parental vaccination](#) (27 January 2022)

"Children unvaccinated against SARS-CoV-2 may still benefit through protection from vaccinated contacts. We estimated the protection provided to children through parental vaccination with the BNT162b2 vaccine. We studied households without prior infection, consisting of two parents and unvaccinated children, estimating the effect of parental vaccination on the risk of infection for unvaccinated children. We studied two periods separately— an early period (January 17, 2021 - March 28, 2021, Alpha variant, two doses vs. no vaccination) and a late period (July 11, 2021 - September 30, 2021, Delta variant, booster dose vs. two-vaccine doses). We found that having a single vaccinated parent was associated with a 26.0% and 20.8% decreased risk, and having two vaccinated parents was associated with a 71.7% and 58.1% decreased risk, in the early and late periods, respectively. To conclude, parental vaccination confers substantial protection for unvaccinated children in the household."

NEJM: [Myocarditis after BNT162b2 Vaccination in Israeli Adolescents](#) (26 January 2022)

"Using an active nationwide surveillance system administered by the Israeli Ministry of Health, we previously found a higher incidence of myocarditis among persons 16 years of age or older who had received the BNT162b2 vaccine (Pfizer–BioNTech) than among historical controls and unvaccinated persons; the incidence was highest among young male recipients.... Here, we report the incidence of hospitalization for myocarditis between June 2 and October 20, 2021, among adolescents in this age group within 21 days after receipt of the first vaccine dose and within 30 days after receipt of the second dose....

In conclusion, the incidence of myocarditis leading to hospitalization among adolescents who received the second dose of the BNT162b2 vaccine was low but was higher than among recipients of the first vaccine dose and proportionately numerically higher than in recent estimates of incidence among unvaccinated persons."

J Adolesc Health: [The Pandemic's Toll on Young Adolescents: Prevention and Intervention Targets to Preserve Their Mental Health](#) (25 January 2022)

"Purpose: Adolescence is characterized by dramatic physical, social, and emotional changes, making teens particularly vulnerable to the mental health effects of the COVID-19 pandemic. This longitudinal study identifies young adolescents who are most vulnerable to the psychological toll of the pandemic and provides insights to inform strategies to help adolescents cope better in times of crisis.

Methods: A data-driven approach was applied to a longitudinal, demographically diverse cohort of more than 3,000 young adolescents (10-14 years) participating in the ongoing Adolescent Brain Cognitive Development Study in the United States, including multiple

prepandemic visits and three assessments during the COVID-19 pandemic (May-August 2020). We fitted machine learning models and provided a comprehensive list of predictors of psychological distress in individuals.

Results: Positive affect, stress, anxiety, and depressive symptoms were accurately detected with our classifiers. Female sex and prepandemic internalizing symptoms and sleep problems were strong predictors of psychological distress. Parent- and youth-reported pandemic-related psychosocial factors, including poorer quality and functioning of family relationships, more screen time, and witnessing discrimination in relation to the pandemic further predicted youth distress. However, better social support, regular physical activities, coping strategies, and healthy behaviors predicted better emotional well-being.

Conclusions: Findings highlight the importance of social connectedness and healthy behaviors, such as sleep and physical activity, as buffering factors against the deleterious effects of the pandemic on adolescents' mental health. They also point to the need for greater attention toward coping strategies that help the most vulnerable adolescents, particularly girls and those with prepandemic psychological problems."

JAMA Pediatr: [Incidence of New-Onset Type 1 Diabetes Among US Children During the COVID-19 Global Pandemic](#) (24 January 2022)

"This cross-sectional study assesses the incidence of new-onset type 1 diabetes among US children during the COVID-19 pandemic....

By measuring a 12-month interval after the onset of the COVID-19 pandemic, our cross-sectional study accounted for seasonal variation in the onset of new T1D cases. Additionally, we reviewed the 5-year period before the COVID-19 pandemic to account for annual increases in T1D cases to show that the case rate during the COVID-19 pandemic was higher than expected at our institution....

In agreement with other studies, we observed a significant increase in the frequency of DKA at the time of T1D diagnosis during the COVID-19 pandemic."

Acta Neurochir: [Cerebral venous sinus thrombosis in infant with COVID-19](#) (19 January 2022)

"We present a rare case of cerebral venous sinus thrombosis in a COVID-19-positive, 2-month-old infant, to this day the youngest described patient with this rare combination of findings. He was hospitalized with focal seizures. The first brain imaging showed subdural hematoma and focal ischemic changes. The subdural hematoma was successfully evacuated. The control imaging, done due to lethargy, showed an extensive cerebral venous sinus thrombosis. The thrombosis was managed with low molecular weight heparin leading to clinical and radiological improvement. With this case report, we would like to add to the information pool of COVID-19 neurological manifestations in children, particularly those younger than 1 year."

Healthcare Workers

News in Brief

"Rich countries' access to foreign nurses during Omicron raises ethical concerns, group says" ([Reuters](#)).

"When your doctor is on TikTok: On a platform rife with falsehoods, a cohort of health-care professionals has stepped in to correct them" ([Atlantic](#); editorial note: Personally, I'm a fan of [@drglaucomflecken](#) for a light-hearted/snarky view of the medical profession, but those working against misinformation are fantastic, too).

Journal Articles

Explor Res Clin Soc Pharm: ["I'm at breaking point"; Exploring pharmacists' resilience, coping and burnout during the COVID-19 pandemic](#) (01 February 2022)

"Background: There is a lack of evidence on how the multimodal dynamic process of resilience has impacted personal adaptation of frontline healthcare professionals, working under extreme pressure during the COVID-19 global pandemic.

Objectives: To explore resilience, burnout and wellbeing for UK pharmacists in patient-facing roles, including individual and organisational factors that align to the ABC-X theoretical model of the dynamic process of resilience.

Methods: A non-experimental pragmatist research design was adopted, with a cross-sectional online survey distributed via social media and professional networks between June and July 2020. Quantitative data aligned to a positivist research paradigm was collected using validated scores, to statistically analyse wellbeing, burnout and resilience. Qualitative textual data, consistent with an interpretivist research paradigm, were analysed following an inductive thematic approach.

Results: A total of 199 surveys from pharmacists working within community, hospital and GP sectors were analysed. Wellbeing scores were strongly correlated to resilience scores. Wellbeing and resilience scores were both inversely correlated with burnout scores. Two-thirds of participants were classified as high-risk within the burnout scales. Key stressors were highlighted by participants, who described how individual resources and perceptions shaped their experience, which overall contributed to their burnout. Organisations that supported pharmacists embraced change and quickly adopted new ways of working, such as teleconsultations, flexible and remote working, redesign of workflow, alongside clear guidance. However, there was also reported frustration at lack of, slow or conflicting guidance from employers.

Conclusions: This study adds to the growing evidence base for how individuals are affected by adverse events in a dynamic environment, alongside the role that employers can play in supporting individual and organisational resilience. It provides an opportunity to learn from pharmacists' responses to the COVID-19 pandemic, and a call to action for healthcare organisations to rebuild and invest resources into sustained support for staff wellbeing."

JAMA Netw Open: [Physician Health Care Visits for Mental Health and Substance Use During the COVID-19 Pandemic in Ontario, Canada](#) (21 January 2022)

"Question: Has the incidence of physicians seeking outpatient care for mental health and substance use changed during the COVID-19 pandemic?

Findings: In a cohort study of 34 055 physicians, the rate of outpatient visits for mental health and substance use increased on average by 13% per physician during the first 12 months of the pandemic compared with the prior 12 months.

Meaning: These findings suggest that the COVID-19 pandemic is associated with greater mental health services use among physicians."

Adv Emerg Nurs J: [Emergency Department Nursing Burnout and Resilience](#) (January/March 2022)

"Burnout is a significant problem in emergency nursing, and it is associated with higher turnover rates than other disciplines of health care. Emergency nurses are highly susceptible to burnout due to continual exposure to traumatic events, varying work schedules, violence directed at staff, and, in recent times, due to the stressors of the COVID-19 pandemic. This literature review will (1) expose the causes of emergency department (ED) nurse burnout and (2) discuss strategies to build resilience in ED nurses. A systematic review of studies published in academic journals discussing burnout and resilience, specifically related to ED nurses, published in English between 2015 and 2019. The databases MEDLINE, Cumulative Index to Nursing and Allied Health Literature (CINAHL), Education Source, Health Source: Nursing/Academic Edition, APA PsycArticles, Military and Government Collection, Gender Studies Database, SocINDEX, and PsycINFO were searched. Sixteen studies were included in this review. Work schedules and shift work, violence toward staff, and lack of management support were factors linked to burnout. Self-discipline, optimism, and goal-oriented behaviors evolved as characteristics of resilient ED nurses. Burnout rates among ED nurses are steep. Shift work, traumatic events, violence, and management support are determinants of burnout. Specialized actions can combat burnout and increase resilience. Nursing management can provide specific education to nurses to assist in this effort."

Mental Health and Wellness

News in Brief

"I've got nothing left to give to end this pandemic" ([BuzzFeed](#)).

"America's split-screen pandemic: Many families resume their lives even as hospitals are overwhelmed — Should we move on? Stay home til omicron wanes? Dueling realities characterize the 23rd month of a crisis that people expected would long be over" ([WP](#)).

Journal Articles

J Racial Ethn Health Disparities: [Psychosocial Stressors and Coping Strategies Among African Americans During Early Stages of the COVID-19 Pandemic: a Qualitative Study](#) (24 January 2022)

Objectives: The disproportionate impact of coronavirus (COVID-19) on African Americans along with associated inequities in social determinants of health (SDOH) and racism increase their vulnerability to the psychosocial impact of COVID-19. This qualitative study applied the socio-ecological model (SEM) to explore psychosocial stressors, coping styles, and needs to improve psychosocial health among unique subgroups of African Americans in early pandemic stages.

Methods: Sixty-two African Americans (16 parents, 15 young adults, 16 essential workers, and 15 individuals with underlying medical conditions) participated in qualitative, semi-structured interviews between May and September 2020. Interview data were analyzed based on the SEM using thematic analysis.

Results: The majority (84%) reported being stressed with parents having the highest level. Four themes emerged : (1) our COVID-19 pandemic state of mind, (2) top stressors in the early stages of the COVID-19 pandemic, (3) coping strategies during COVID-19, and (4) needs during the COVID-19 pandemic to reduce stress. While there were similarities, different stressors were experienced among subgroups, which yielded different coping styles and needs from stakeholders across multi-levels to improve their psychosocial health.

Conclusions: Findings suggest current and future pandemic response plans need targeted strategies across multiple levels of influence to address the psychosocial impact of the COVID-19 pandemic on African Americans."

JAMA Netw Open: [Trends in Psychological Distress Among US Adults During Different Phases of the COVID-19 Pandemic](#) (24 January 2022)

"This survey study assesses trends in psychological distress among US adults surveyed during 4 different phases of the COVID-19 pandemic in 2020 and 2021."

Other Infectious Diseases and Public Health Threats

News in Brief

"The staggering death toll of drug-resistant bacteria — global survey shows that in 2019, antimicrobial resistance killed more people than HIV/AIDS or malaria" ([Nature](#)).

"Experimental HIV vaccine, based on Moderna's mRNA technology, now in clinical trial" ([WP](#)).

"'Havana Syndrome' symptoms in small group most likely caused by directed energy, says U.S. intel panel of experts" ([NBC](#)).

The CDC is investigating two separate *Listeria* outbreaks: one is inked to packaged salads produced by Dole ([CDC](#)), the other packaged salads produced by Fresh Express ([CDC](#)).

Podcast: "Public Health on Call: Evidence and experts to help you understand today's public health news—and what it means for tomorrow" ([JHUPH](#)).

History of Medicine

Genomic sequencing of ancient DNA illuminates plague origins" ([ASM](#)).

Check out the 'history of infectious disease outbreaks and vaccines timeline' ([Mayo Clinic](#)).

Statistics

	<i>Total Cases</i>	<i>Total Deaths</i>
<i>Global</i>	388,883,686	5,715,462
<i>United States</i>	75,997,123	897,400

[JHU CSSE](#) as of 1000 ET 04 February 2022

	<i>Case Rate</i>	<i>Hospitalization Rate</i>	<i>Fatality Rate</i>
<i>Virginia</i>	1,572,022	47,148	16,703
<i>Chesapeake</i>	19,395	534	161
<i>Hampton</i>	19,495	530	197
<i>Newport News</i>	19,508	543	186
<i>Norfolk</i>	16,568	789	164
<i>Portsmouth</i>	21,115	1,129	281
<i>Suffolk</i>	19,286	1,009	281
<i>Virginia Beach</i>	19,141	837	150

[VA DOH](#) as of 1000 ET 04 February 2022

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